



Letter to the Editor

Assessing the psychological response to the COVID-19: A response to Bitan et al. "Fear of COVID-19 scale: Psychometric characteristics, reliability and validity in the Israeli population"



The worldwide development of novel coronavirus disease 2019 (COVID-19) has resulted in a number of challenges for healthcare providers (Lin, 2020). One such challenge is to understand the psychological responses toward the fear of COVID-19. To overcome this particular challenge, the present authors co-developed the Fear of COVID-19 Scale (FCV-19S), an instrument with promising psychometric properties that healthcare providers can use to quickly understand the fear of individuals during COVID-19 outbreak (Ahorsu et al., 2020). More recently, Bitan et al. (2020) translated the FCV-19S into Hebrew for Israeli population and found that the Hebrew FCV-19S had good psychometric properties. However, unlike the single factor found in other published FCV-19S validation studies (e.g., Ahorsu et al., 2020; Sakib et al., 2020; Satici et al., 2020; Soraci et al., 2020), Bitan et al. (2020) proposed a two-factor model for the Hebrew FCV-19S. However, the present authors would like to comment on the statistical analysis that Bitan et al. (2020) used to identify the two-factor structure.

More specifically, Bitan et al. (2020) described that they applied an exploratory factor analysis to examine the factor structure of the Hebrew FCV-19S and found a single factor that explained substantial amount of the variance (53.71%). They then forced the exploratory factor analysis to have a two-factor solution and reanalyzed the exploratory factor analysis. They were satisfied with the two-factor solution and concluded that "the two factors corresponded to two distinct factors (p.8)". The first factor was described as an emotional fear reaction and the second factor was described as symptomatic expressions of fear. Although the present authors welcome that Bitan et al. (2020) tried to ascertain another solution for the FCV-19S factor structure, their practice is inappropriate in a number of aspects.

First, with other studies having shown a clear single-factor structure for the FCV-19S (Ahorsu et al., 2020; Reznick et al., 2020; Sakib et al., 2020; Satici et al., 2020; Soraci et al., 2020), Bitan et al. (2020) should have used confirmatory factor analysis rather than exploratory factor analysis to examine the factor structure of the Hebrew FCV-19S. Second, Bitan et al. (2020) did not provide any justification as to why they forced the exploratory factor analysis to produce a two-factor solution. They first identified a single factor and the present authors and readers may be left wondering why Bitan et al. (2020) did not keep the single-factor solution. Bitan et al. (2020) did not outline any theoretical assumptions or framework as to why they performed a two-factor solution. However, even if they had a theoretical assumption for two-factor solution, confirmatory factor analysis rather than exploratory factor analysis should have been used (Watkins, 1989). Additionally, they should have used an oblique method rather than an orthogonal method (i.e., Varimax in the SPSS) in the factor rotation. Third, the present authors suspect that the Bitan et al. (2020) actually conducted a principal component analysis (PCA) rather than a real exploratory factor analysis in their study. The reason for suspicion is because IBM

SPSS Statistics for Windows software sets PCA as a *default* extraction method under the category of *factor analysis*. Therefore, Bitan et al. (2020) probably did not notice this, and they may have wrongly used PCA to examine the factor structure of the Hebrew FCV-19S. Exploratory factor analysis and PCA, from the view of psychometrics, have different goals (Tabachnick and Fidell, 2007). Principal component analysis is a technique for researchers to reduce the dimensionality of their data and provide parsimonious data for further statistical analysis. Exploratory factor analysis is a technique for researchers to identify and assess latent constructs (i.e., a concept that cannot be measured directly, such as fear assessed in the FCV-19S).

Although the exploratory factor analysis that Bitan et al. (2020) carried out on testing factor structure of the Hebrew FCV-19S was misplaced, the other psychometric testing performed by Bitan et al. (2020) was appropriate. More specifically, Bitan et al. (2020) reported the very good internal consistency ($\alpha=0.86$) for the Hebrew FCV-19S. They also found that the Hebrew FCV-19S had satisfactory concurrent validity as evidenced by the significant association with relevant demographics (e.g., females had higher fear than males). The Hebrew FCV-19S also demonstrated good convergent and discriminant validity as evidenced by the significant correlations with anxiety ($r=0.43$), followed by stress ($r=0.33$) and depression ($r=0.24$).

To conclude, the present authors believe that the FCV-19S is a psychometrically robust instrument that can help healthcare providers to quickly understand how an individual fears COVID-19 during the pandemic. With only seven items, the FCV-19S has the great advantage of brevity and will be especially useful in a busy clinical setting because it is so quick to administer. Another advantage of the FCV-19S is the many different language versions that have already been published in such a short time since the FCV-19S was initially developed which will allow cross-cultural comparisons to be made. For example, the first paper published FCV-19S provides both Persian and English versions (Ahorsu et al., 2020). Other language versions such as Bangla (Sakib et al., 2020), Turkish (Satici et al., 2020), Arabic (Alyami et al., 2020), Italian (Soraci et al., 2020), Russian (Reznick et al., 2020), and Hebrew (Bitan et al., 2020) have been already translated and tested for psychometric properties. Moreover, research teams in over 20 different countries have approached the present authors and requested to validate the FCV-19S. The present authors are also aware of several studies that found the excellent psychometric properties of the FCV-19S are currently under review. Therefore, the use of FCV-19S is highly recommended during the COVID-19 pandemic.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2020.113127](https://doi.org/10.1016/j.psychres.2020.113127).

<https://doi.org/10.1016/j.psychres.2020.113127>

Received 20 May 2020; Accepted 22 May 2020

Available online 27 May 2020

0165-1781/ © 2020 Elsevier B.V. All rights reserved.

References

- Ahorsu, D.K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M.D., Pakpour, A.H., 2020. Fear of COVID-19 Scale: Development and initial validation. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00270-8>. Advance online publication.
- Alyami, M., Henning, M., Krägeloh, C.U., Alyami, H., 2020. Psychometric evaluation of the Arabic version of the Fear of COVID-19 Scale. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00316-x>. Advance online publication.
- Bitan, D.T., Grossman-Giron, A., Bloch, Y., Mayer, Y., Shiffman, N., Mendlovic, S., 2020. Fear of COVID-19 scale: Psychometric characteristics, reliability and validity in the Israeli population. *Psychiatry Res.* <https://doi.org/10.1016/j.psychres.2020.113100>. Advance online publication.
- Lin, C.-Y., 2020. Social reaction toward the 2019 novel coronavirus (COVID-19). *Soc. Health Behav.* 3, 1–2. https://doi.org/10.4103/SHB.SHB_11_20.
- Reznik, A., Gritsenko, V., Konstantinov, V., Khamenka, N., Isralowitz, R., 2020. COVID-19 fear in Eastern Europe: Validation of the Fear of COVID-19 Scale. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00283-3>. Advance online publication.
- Sakib, N., Mamun, M.A., Bhuiyan, A.K.M.I., Hossain, S., Mamun, F.A., Hosen, I., Abdullah, A.H., Sarker, M.A., Mohiuddin, M.S., Rayhan, I., Hossain, M., Sikder, M.T., Gozal, D., Muhit, M.A., Islam, S.M.S., Griffiths, M.D., Pakpour, A.H., 2020. Psychometric validation of the Bangla Fear of COVID-19 Scale: Confirmatory factor analysis and Rasch analysis. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00289-x>. Advance online publication.
- Satici, B., Gocet-Tekin, E., Deniz, M.E., Satici, S.A., 2020. Adaptation of the Fear of COVID-19 Scale: Its association with psychological distress and life satisfaction in Turkey. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00294-0>. Advance online publication.
- Soraci, P., Ferrari, A., Abbiati, F.A., Del Fante, E., De Pace, R., Griffiths, Urso A., 2020. Validation and psychometric evaluation of the Italian version of the Fear of COVID-19 Scale. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00277-1>. Advance online publication.
- Tabachnick, B.G., Fidell, L.S., 2007. *Using multivariate statistics*, 5th ed. Pearson Allyn & Bacon, Upper Saddle River, NJ.
- Watkins, D., 1989. The role of confirmatory factor analysis in cross-cultural research. *Int J Psychol* 24 (6), 685–701. <https://doi.org/10.1080/00207598908247839>.
- Amir H. Pakpour^{a,b,1}, Mark D. Griffiths^{c,1}, Chung-Ying Lin Dr. (PhD)^{d,*}
^a *Social Determinants of Health Research Center, Research Institute for prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin 3419759811, Iran*
^b *Department of Nursing, School of Health and Welfare, Jönköping University, Jönköping, Sweden*
^c *International Gaming Research Unit, Psychology Department, Nottingham Trent University, Nottingham, UK*
^d *Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Hong Kong*
E-mail addresses: cylin36933@gmail.com, cy.lin@polyu.edu.hk (C.-Y. Lin).

* Corresponding author: Department of Rehabilitation Sciences, Faculty of Health and Social Sciences, The Hong Kong Polytechnic University, 11 Yuk Choi Rd, Hung Hom, Hong Kong.

¹ Equally contributed to the paper.